



Numerical modelling of deformation changes induced by lake-level fluctuations of the Hohenwarte reservoir, Thuringia, Germany

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The Hohenwarte reservoir in southeast Thuringia (Germany) is a medium-sized artificial reservoir, holding on average 180 million m³ of water. It was constructed between 1936 and 1943 and is operational since then. The water load impounded induces stress and deformations of the underlying crust and upper mantle.

The Geodynamic Observatory Moxa is located around 4 km to the north. The observatory is equipped with seismometers and sensitive tilt- and strainmeters, accurate to the nrad and nstrain range.

We explore the deformation effects caused by the water load of the Hohenwarte reservoir, both on a short-term seasonal time scale and a long-term decadal time scale. The seasonal effect, mainly induced by elastic deformation, results in tilt and strain deformation in the 4 μ rad and 1 μ strain ranges, respectively. Long-term decadal variations, however, are unlikely to be significant, if a realistic viscoelastic structure of the underlying upper mantle is used.